

### **REMARKS**

The foregoing amendment amends independent claims 1, 15, 48 and 49. Pending in the application are claims 1-22, 24-41, 48 and 49, of which claims 1, 15, 48 and 49 are independent. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

Independent claims 1, 15, 48 and 49 are amended to clarify that the depth of the fluid interface port extends from an outer surface of the side wall to an inner surface of the side wall, that the depth is constant, and to clarify the relative dimensions of the depth and diameter of the port. In addition, the amendments clarify that the microchannel diameter is greater than the diameter of the fluid interface port formed in the side wall of the microchannel. *No new matter is added.*

Amendment and/or cancellation of the claims is not to be construed as an acquiescence to any of the objections/rejections set forth in the instant Office Action, and was done solely to expedite prosecution of the application. Applicant reserves the right to pursue the claims as originally filed, or similar claims, in this or one or more subsequent patent applications.

#### **Double Patenting Rejection**

Claims 1-22 and 24-41 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 and 58-150 of copending Application No. 10/028,852 as characterized by US 2003/0007898 and claims 1-45 copending Application No. 10/057,354. Applicants submit that the claims are patentably distinct from the claims of co-pending U.S. Patent Application Nos. 10/028,852 and 10/057,354. If necessary, Applicants will file a Terminal Disclaimer upon resolution of all other outstanding issues.

In addition, the Examiner rejects claims 1-22 and 24-41 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent Number 6,877,528. The claims in the present application are entirely different from the claims in U.S. Patent Number 6,877,528. For example, the claims in the present invention are directed to a fluid interface port for interfacing fluid between an interior and an exterior of a channel. In

contrast, the claims of the '528 patent are directed to a valve for a microfluidic device for regulating fluid flow therein. The meniscus in the '528 claims interfaces a side channel with a reservoir, not an exterior environment, that is used to create a pressure pulse. In contrast, the meniscus in the present application is formed within and co-planar with a side wall of a channel, such that the meniscus is flush with the side wall. In addition, the meniscus in the claims of the '528 patent is not necessarily a virtual wall and used only to transfer a pressure pulse to a flow channel in order to regulate flow therein. The meniscii in the two sets of claims have different configurations and purposes. In addition, both the claims of the '528 patent recite different features, such as a gas-filled first reservoir, a buffer reservoir, actuators, side channels not present in the claims of the present invention.

#### Claim Rejections Under 35 USC §112

Regarding the rejection of claims 1-22 and 24-41 under 35 USC §112, Applicants submit that the cited recitation is clear and definite. To expedite prosecution, Applicants have amended independent claims 1, 15, 48 and 49 to more fully clarify the invention. In particular, Applicants submit that the diameter of the port is between about 25 and 100 microns. The depth of the fluid interface port extends through the side wall, i.e., from an outer surface of the side wall to an inner surface of the side wall. The depth is also significantly smaller than the diameter. For a diameter that is 25 microns, the depth of the fluid interface port is significantly smaller. For a diameter that is 100 microns, the depth of the fluid interface is significantly smaller than 100 microns.

#### Claim Rejections Under 35 USC §102

In the Office Action, the Examiner rejects claims 1-22 and 24-41 under 35 U.S.C. 102(e) as being anticipated by the Chow reference (U.S. Patent Number 6,494,230), claims 1-22 and 24-41 under 35 U.S.C. 102(b) as being anticipated by the Handique reference (U.S. Patent Number 6,130,098), and claims 1-22 and 24-41 under 35 U.S.C. 102(b) as being anticipated by the Fuchs reference (U.S. Patent Number 5,757,482). Applicants submit that the pending claims distinguish patentably over the cited references, and request reconsideration and allowance of the pending claims.

Applicants maintain that the cited references, alone or in combination, do not disclose a device having a fluid interface port with a constant depth that is substantially smaller than the diameter of the fluid interface port, as recited in independent claims 1 and 15. The recited fluid interface ports thus have a disk shape, as shown in Figures 2A and 2B, and described on page 17, lines 19-20, to facilitate *direct* access to the channel interior, a feature not taught or suggested in the cited references.

According to the Examiner, the Chow reference shows a channel, equivalent to the microchannel in the substrate of the claimed invention, having a variable cross section and are smaller than the diameter of the port. The relative dimensions of the claim do not refer to the diameter of the microchannel relative to the diameter of the port, but rather, the depth of the port relative to the diameter of the port. The depth of the fluid interface port refers not to the depth of the microchannel, but rather the depth *through the sidewall* of the microchannel. In addition, the ports 126 and 128 in Chow are relatively large and are clearly larger in diameter than the associated microchannel, in contrast to the claimed invention.

In addition, the entry port (A) in Handique has a cross-section diameter greater than the diameter of the channel, in contract to the claimed invention. In addition, the vent 70 in Handique forms a channel having a depth that is significantly *larger* than the cross-section of the channel, in contrast to the claimed invention. The vent 70 is also incapable of positioning a meniscus in a co-planar location with a side wall. Rather, any meniscus formed in the vent 70 of Handique will align only with a small portion of a side wall, in contrast to the claimed invention.

In addition, the cross-sectional diameter of the port 24 in Fuchs is significantly *larger* than the channels 12, also in contrast to the claimed invention. In addition, the Fuchs reference discloses that the port 24 is formed in the cover 12, which is at least 400 microns thick, as set forth in column 5, lines 12-14. Therefore, even *if* the depth of the port 24 *was* significantly smaller than the diameter of the port, the diameter would be required to be several times the recited range of between about 25  $\mu\text{m}$  and about 100  $\mu\text{m}$ .

For at least these reasons, and for the reasons submitted in previous responses, Applicants respectfully submit that all pending examined claims are patentable, and request that the objections and rejections be reconsidered and withdrawn.

**CONCLUSION**

In view of the above amendment, applicants believe the pending application is in condition for allowance.

If any fee is due, please charge our Deposit Account No. 12-0080, under Order No. TGZ-001C from which the undersigned is authorized to draw.

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